

INSTRUMENT READINESS PLAN (IRP)

FOR THE

NSLS-II DIAGNOSTIC/R&D BEAMLINE (CELL 22)

AND THREE POLE WIGGLER



JULY 2017

NSLSII-22BM-PLN-001

PREPARED BY
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FOR THE
U.S. DEPARTMENT OF ENERGY
OFFICE OF SCIENCE BASIC ENERGY SCIENCE
UNDER CONTRACT DE-SC0012704

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AND THREE POLE WIGGLER

JULY 2017

PREPARED BY:



A. Ackerman, Instrument Readiness Coordinator

APPROVED AS A PLAN TO ACHIEVE READINESS BY:




P. Zschack, IRR Technical Authority (Beamline)



T. Shaftan, IRR Technical Authority (3PW)

CONCURRENCE BY:



R. Lee, ESH Manager

APPROVED – IRP HAS BEEN FULLY IMPLEMENTED AND INSTRUMENT IS READY FOR COMMISSIONING:

 July 15th 2017

P. Zschack, IRR Technical Authority (Beamline)



7/19/2017

T. Shaftan, IRR Technical Authority (3PW)

CONCURRENCE BY:

 7-19-17

R. Lee, ESH Manager

REVISION HISTORY

REVISION	DESCRIPTION	LIST OF REVIEWERS	DATE
1	First Issue	See completed tables	July 2017

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1.0 INTRODUCTION

1.1 Purpose and Scope

The purpose of this Instrument Readiness Plan (IRP) is to establish the readiness criteria required to declare the NSLS-II Diagnostic/Research and Development (R&D) Beamline (Cell 22) and Three Pole Wiggler (3PW) ready for commissioning. The scope of this IRP includes the Cell 22 Beamline, Front End and 3PW, and was prepared in accordance with the *Instrument Readiness Review Procedure* (PS-C-ESH-PRC-001).

This IRP will be used as a tool for planning and certifying readiness. The completion of this IRP requires that all documentation and hardware listed in the plan are completed, tested, and where required, independently certified. In addition, Staff and Users that will be involved in commissioning shall be trained and qualified to conduct their work safely, securely and in an environmentally sound manner.

1.2 Instrument Readiness Review (IRR)

As part of the verification of readiness for commissioning, an IRR is required in accordance with the *Instrument Readiness Review Procedure* (PS-C-ESH-PRC-001). An independent IRR Team will use the readiness criteria developed as part of this IRP to verify that the Cell 22 Beamline and 3PW are ready for commissioning in accordance with the appropriate Commissioning Plans. Pre-start and post-start findings will be identified by the team.

1.3 Authorization to Proceed with Commissioning

The completion of this IRP, together with closure of any pre-start findings from the IRR, is used as the basis for the NSLS-II Director to authorize the start of commissioning of the Cell 22 Beamline and 3PW.

2.0 INSTRUMENT READINESS PLAN

2.1 Readiness Criteria

Readiness criteria are provided in Attachments A through D. The criteria were developed by the Instrument Readiness Coordinator (IRC) and Readiness Team members, using the *General Readiness Criteria* provided in Attachment A and the *Instrument Readiness Guide* provided in Attachment C of the *Instrument Readiness Review Procedure* (PS-C-ESH-PRC-001).

The readiness criteria are grouped into the following categories:

- Pillar I – Documentation
- Pillar II – Hardware
- Pillar III – Personnel
- Completion of IRR Pre–Start Findings.

3.0 IRP IMPLEMENTATION

3.1 Readiness Team

A Readiness Team will be appointed by the NSLS-II Director in accordance with the *Instrument Readiness Review Procedure* (PS-C-ESH-PRC-001). The Readiness Team members that have responsibility for completing the IRP are listed as the Responsible Person in the Attachments.

3.2 Achieving Readiness – Responsibilities

The Readiness Team members are responsible for ensuring that their specific readiness criteria are achieved.

The Insertion Devices Group Leader, the Diagnostics Group Leader and the R&D Lead Beamline Scientist are responsible for certifying that all of the readiness criteria associated with the subject beamlines and 3PW are achieved.

3.3 Execution of the IRP

The Readiness Team members shall execute this IRP by preparing, installing, documenting, or training (as appropriate), the specific scope of work (readiness criteria) assigned to them as listed in the Attachments. The Readiness Team members shall develop, compile or assemble the documented evidence that clearly demonstrates that the readiness criteria have been met. This evidence shall be listed on the Attachments.

3.4 Certifying Readiness

Upon completion of the readiness criteria, the Readiness Team members will certify that the criteria for which they are responsible for are complete by signing the Attachments in the appropriate section. The Attachments shall not be signed until the readiness criteria have been fully achieved.




For completion of the IRR pre-start findings, if identified, the IRR Technical Authorities and the ESH Manager will certify that all IRR pre-start findings relative to the Cell 22 Beamline and 3PW have been completed, and that the associated ATS Actions have been closed by signing Attachment D in the appropriate section. The Independent Verifier will concur that these actions have been adequately completed and closed by signing Attachment D in the appropriate section.

4.0 REFERENCES

4.1 PS-C-ESH-PRC-001, *Instrument Readiness Review Procedure*

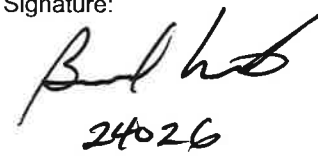
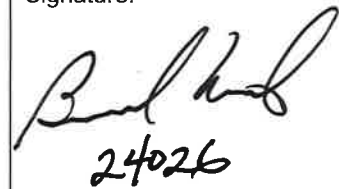
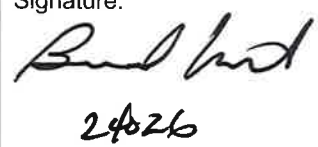
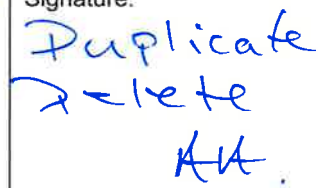
4.2 PS-C-ESH-ROASE-001, *NSLS-II Accelerator Safety Envelope (ASE)*

**ATTACHMENT A – PILLAR I DOCUMENTATION
CELL 22 BEAMLINE AND THREE-POLE WIGGLER**

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	Functional Description An overview presentation is prepared that defines the scope of the IRR and includes the following Beamline and 3PW specific information: <ul style="list-style-type: none"> - Primary capabilities - Physical layout and location - Radiation Safety Components - Summary of design performance parameters - List of credited controls - Self-identified pre-start findings, if applicable - Description and status for each item listed in this Instrument Readiness Plan 	W. Cheng Lead Beamline Scientist	<ul style="list-style-type: none"> • Develop the presentation and document described for the Diagnostic Beamline 	<ul style="list-style-type: none"> • Presentation • Functional Description Document 	Signature: 
		P. Siddons Lead Beamline Scientist	<ul style="list-style-type: none"> • Develop the presentation and document described for the R&D Beamline 	<ul style="list-style-type: none"> • Presentation • Functional Description Document 	Signature: 
	ID Design Components are designed in accordance with PS-QAP-0412, <i>Design Reviews</i> and PS-C-QAS-PRC-010, <i>Engineering Design by Others</i> .	T. Tanabe ID Group Leader	<ul style="list-style-type: none"> • Complete Engineering Design Reviews for the 3PW that address mechanical support and configuration control 	<ul style="list-style-type: none"> • Requirements, Specifications, and Interface Document (RSI) • Internal design review documents 	Signature: 


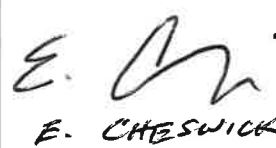

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

**ATTACHMENT A – PILLAR I DOCUMENTATION
CELL 22 BEAMLINE AND THREE-POLE WIGGLER**

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	Radiation Safety Component Design Radiation Safety Components for the FE are designed in accordance with NSLS-II requirements, PS-QAP-0412, <i>Design Reviews</i> and PS-C-QAS-PRC-010, <i>Engineering Design by Others</i> .	B. Kosciuk Diagnostics Engineer	<ul style="list-style-type: none"> Complete requirements analysis and design of radiation safety components for the FE 	<ul style="list-style-type: none"> Internal design review documents RSC report 	Signature:  24026
	Specific Beamline Component Design Beamline vacuum window and water cooled mask assemblies are designed in accordance with PS-QAP-0412, <i>Design Reviews</i> and PS-C-QAS-PRC-010, <i>Engineering Design by Others</i> .	B. Kosciuk Diagnostics Engineer	<ul style="list-style-type: none"> Complete Engineering Design Reviews for the Beamline that address thermal management, mechanical support, configuration control and vacuum 	<ul style="list-style-type: none"> Internal and contractor supplied design review documents and reports Diamond window pressure safety reports 	Signature:  24026
	Ray Traces Bremsstrahlung and Synchrotron Ray Traces generated in accordance with PS-C-ASD-PRC-147, <i>Insertion Device Front End Ray Tracing Procedure</i> .	B. Kosciuk Diagnostics Engineer	<ul style="list-style-type: none"> Prepare the Ray Traces for the FE 	<ul style="list-style-type: none"> Primary Bremsstrahlung Ray Traces Maximum Synchrotron Ray Traces 	Signature:  24026
	Radiation Safety Components Design Radiation Safety Components for the Beamline are designed in accordance with NSLS-II requirements, PS-QAP-0412, <i>Design Reviews</i> and PS-C-QAS-PRC-010, <i>Engineering Design by Others</i> .	B. Kosciuk Diagnostics Engineer	<ul style="list-style-type: none"> Complete requirements analysis and design of radiation safety components for the FE 	<ul style="list-style-type: none"> Internal design review documents RSC report 	Signature:  24026



*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

**ATTACHMENT A – PILLAR I DOCUMENTATION
CELL 22 BEAMLINE AND THREE-POLE WIGGLER**

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	Unreviewed Safety Issue (USI) Evaluations/Screenings Authorization basis hazard identification is managed through USI evaluation/screening.	S. Moss Authorization Basis Manager	<ul style="list-style-type: none"> Verify that the SAD and ASE accurately cover the hazards associated with the subject Beamline, FE and 3PW; including temporary systems Complete any associated USI evaluations/screenings 	<ul style="list-style-type: none"> SAD and ASE USI screenings/evaluations Applicable waivers 	Signature:  07/14/17
	Resolution of Open Action Tracking System (ATS) Actions Instrument specific action items from previous internal and external oversight groups (e.g., RSC, Design Reviews, etc.) are addressed. Previous IRR action items are addressed.	E. Cheswick QA Engineer	<ul style="list-style-type: none"> ATS action items for the FE and 3PW shown as closed with supporting evidence 	<ul style="list-style-type: none"> ATS System 	Signature:  E. CHESWICK
	FE and ID Commissioning Plan A commissioning plan has been developed in accordance with PS-C-CMD-PLN-001, <i>NSLS-II Process Description: Review Process for Facility Additions and Modifications</i> .	G. Wang Accelerator Coordination Group Leader	<ul style="list-style-type: none"> Verify that NSLS-II Insertion Device and Front Ends Commissioning Sequence (PS-C-ASD-PRC-166) adequately covers commissioning for the FE and 3PW 	<ul style="list-style-type: none"> NSLS-II Insertion Device and Front Ends Commissioning Sequence (PS-C-ASD-PRC-166) 	Signature: 

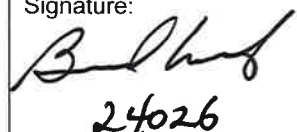

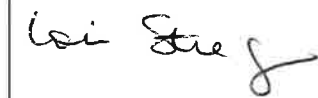
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**ATTACHMENT A – PILLAR I DOCUMENTATION
CELL 22 BEAMLINE AND THREE-POLE WIGGLER**

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	FE and ID Radiation Survey Procedure A procedure describing the steps required during commissioning has been generated and includes component testing with beam, radiation surveys, hold points, and plans for ramping up electron beam current.	M. Benmerrouche Radiation Physicist	<ul style="list-style-type: none"> Confirm that Radiation Surveys were completed when shadow shield was installed 	<ul style="list-style-type: none"> Radiation Surveys 	Signature: 
	Proposal Allocation Safety & Scheduling (PASS) The instrument is active within PASS with approvals to proceed with Technical Commissioning.	P. Siddons Lead Beamline Scientist	<ul style="list-style-type: none"> Assure that PASS is configured to administer the instrument 	<ul style="list-style-type: none"> Defined resource within PASS Submitted Technical Commissioning proposal Submitted Safety Approval Form 	Signature: 






*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT B – PILLAR II HARDWARE
CELL 22 BEAMLINE AND THREE-POLE WIGGLER

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II SAFETY CRITICAL HARDWARE (INSTALLATION)	Radiation Safety Components: Installation Radiation Safety Components are installed in accordance with the Travelers/ITRs.	B. Kosciuk Diagnostics Engineer	<ul style="list-style-type: none"> Execute ITR 	<ul style="list-style-type: none"> Completed ITR 	Signature:  24026
	Radiation Safety Components: Configuration Control A Radiation Safety Component Checklist Template is generated in accordance with NSLSII-ESH-PRC-004, <i>Radiation Safety Component Inspection Procedure</i> .	L. Doom Accelerator Coordination Group Engineer	<ul style="list-style-type: none"> Verify that the existing FE Radiation Safety Component Checklist Template includes the subject FE and 3PW 	<ul style="list-style-type: none"> Approved Storage Ring Radiation Safety Component Checklist Template w/ RSC review 	Signature: 
	Beamline Electrical Power SBMS electrical power distribution requirements are satisfied. SBMS Electrical Equipment Inspection (EEI) requirements are satisfied.	L. Stiegler ESH Operations Manager	<ul style="list-style-type: none"> Conduct a walkthrough inspection with the appropriate SME support 	<ul style="list-style-type: none"> Inspection report 	Signature: 
	Beamline Utilities Permanent utility systems are installed and tested (i.e., DI Water) in accordance with design drawings.				
	Beamline Component Mechanical Assembly Components are assembled with adequate structural integrity.				

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.


ATTACHMENT B – PILLAR II HARDWARE
CELL 22 BEAMLINE AND THREE-POLE WIGGLER

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II OTHER HARDWARE (INSTALLATION)	Three Pole Wiggler Installation 3PW is installed and tested in accordance with the traveler.	J. Rank ID Engineer	<ul style="list-style-type: none"> Generate Traveler and drawing Execute Traveler Test performance 	<ul style="list-style-type: none"> Completed Traveler Test reports 	Signature: 
	Equipment Protection System (EPS) Interlocks (Phase 1 installation for 3PW operation only) Hardware/Software installed and tested in accordance with PS-C-ASD-SPC-EPS-001, <i>Equipment Protection System (EPS) Design Description</i> and confirmed.	G. Ganetis Electrical Engineering Group Leader	<ul style="list-style-type: none"> Verify EPIOS integration Test system performance 	<p align="center">(*)</p> <p align="center">No Test Report required</p> <p>Test report</p>	Signature: 
	Controls and Diagnostics Hardware/Software installed and tested in accordance with NSLS-II requirements.	D. Padraza Diagnostics Group Leader	<ul style="list-style-type: none"> Test system performance Complete integral testing 	Diagnostic Beamline: <ul style="list-style-type: none"> Performance and integral testing checklist (ITR) Schematics 	Signature: 
		Y. Tian Accelerator Controls Group Leader	<ul style="list-style-type: none"> Test system performance Complete integral testing 	R&D Beamline: <ul style="list-style-type: none"> Performance and integral testing documentation 	Signature: 
		H. Bassan Motion Controls Group Leader	<ul style="list-style-type: none"> Test system performance Complete integral testing 	3PW: <ul style="list-style-type: none"> Performance and integral testing checklist 	Signature: 

(*) Action: Verify that past ARRs included review of the Storage Ring (SR) EPS and that no changes were made to the SR EPS for this beamline. No Test Report is required.

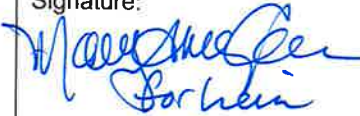


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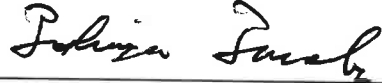


**ATTACHMENT B – PILLAR II HARDWARE
CELL 22 BEAMLINE AND THREE-POLE WIGGLER**

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II OTHER HARDWARE (INSTALLATION)	Vacuum Vacuum hardware has been installed and tested in accordance with the Traveler and has the capability of achieving full vacuum needed during commissioning.	D. Padrazo Diagnostics Group Leader	<ul style="list-style-type: none"> • Generate and execute Top Level Traveler • Identify overpressure devices • Test system performance 	<ul style="list-style-type: none"> • Test Report • Completed Traveler • Completed ITR 	Signature: 

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT C – PILLAR III PERSONNEL
CELL 22 BEAMLINE AND THREE-POLE WIGGLER

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR III PERSONNEL	R&D Lead Beamline Scientist (LBS), Authorized Beamline Staff, and Support Staff Sufficient personnel to begin commissioning are assigned and Trained/Qualified.	B. Lein Training Group Leader	• Assign JTA	• BTMS record	Signature: 
	Diagnostics Lead Beamline Scientist (LBS), Authorized Beamline Staff, and Support Staff Sufficient personnel to begin commissioning are assigned and Trained/Qualified.	B. Lein Training Group Leader	• Assign JTA	• BTMS record	Signature: 
	Lead Operators, Scientific Operators & FLOCOS Trained/Qualified to commission the FE and 3PW.	B. Lein Training Group Leader	• Train Operators	• BTMS record	Signature: 

* READINESS CERTIFICATION	T. Tanabe – Insertion Devices Group Leader	Signature: 
* READINESS CERTIFICATION	P. Siddons – R&D Lead Beamline Scientist	Signature: 
* READINESS CERTIFICATION	D. Padrazo – Diagnostics Group Leader	Signature: 

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT D – COMPLETION OF IRR PRE–START FINDINGS
CELL 22 BEAMLINE AND THREE-POLE WIGGLER

READINESS CRITERIA		RESPONSIBLE PERSON	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
IRR PRE–START FINDINGS	No Pre-Start Findings Identified (Beamline) No pre-start findings associated with the Cell 22 Beamline and 3PW have been identified by the Review Team and therefore the following lines do not require sign-off.	R. Lee ESH Manager	• IRR Preliminary Report	Signature:
		M. Hauptmann Independent Verifier	• IRR Preliminary Report	Signature:
	Pre-Start Actions Complete All actions associated with the Cell 22 Beamline IRR pre-start findings are completed and the ATS Actions are closed.	P. Zschack IRR Technical Authority	• Pertinent closure evidence	Signature:
	Pre-Start Actions Complete All actions associated with the Cell 22 3PW IRR pre-start findings are completed and the ATS Actions are closed.	T. Shaftan IRR Technical Authority	• Pertinent closure evidence	Signature:
	Pre-Start Actions Verified All actions associated with the Cell 22 Beamline and 3PW IRR pre-start findings have been verified complete.	R. Lee ESH Manager	• Pertinent closure evidence	Signature:
	Pre-Start Actions Independently Verified Actions associated with the Cell 22 Beamline and 3PW IRR pre-start findings have been satisfactorily completed.	M. Hauptmann Independent Verifier	• Pertinent closure evidence	Signature:

– END –

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.